

Remarks

Upon entry of the foregoing amendments, claims 1, 3-6, 8-10, 27-39, and 43-55 are pending in the application, with claims 1 and 6 being the independent claims. Claims 2, 7, 11-26, and 40-42 are herewith sought to be cancelled without prejudice to or disclaimer of the subject matter therein. Applicants reserve the right to pursue any of the cancelled subject matter. Claims 1, 6, 27, 28, 43, and 44 are sought to be amended. Support for the amendments can be found throughout the application as filed and in the original and previously presented claims. Support can be found, for example, in previous claims 26 and 42; at page 37, lines 12-15; at page 42, lines 18-20; and in Figure 7 of the application as filed. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Applicants have submitted herewith a substitute Sequence Listing that is intended to replace the existing Sequence Listing. The substitute Sequence Listing is submitted to correct typographical errors discovered in the existing Sequence Listing. Specifically, SEQ ID NOs: 1, 4, 6, and 8 were discovered to contain typographical errors in which nucleotide bases were inadvertently excluded from the sequences or incorrect nucleotide bases were included in the sequences. The corrected sequences with the introduced nucleotide bases underlined and deleted nucleotide bases shown in double brackets follows:

SEQ ID NO:1: GACTGGATCCATGGAGCCCAGCAGCAAG

SEQ ID NO:4: [[GAAA]]GACTAAGCTTTTACTTCATCG[[C]]CCTTTGAC

SEQ ID NO:6: CCCCGCATGCTTATTCCTCGGAAACTCTT

SEQ ID NO:8: CCTCTAGATTACTTTTTC CGAACATC

Support for the corrected sequences can be found at pg. 40, lines 10-23 of the application as filed. In accordance with 37 C.F.R. § 1.821(g), this submission includes no new matter, as it is fully supported by the original specification as filed. Accordingly, entry of the substitute Sequence Listing is respectfully requested.

Applicants request entry and consideration of this amendment and response under 37 C.F.R. § 1.116(b)(3). Applicants believed that the previously submitted claims were in condition for allowance and have only amended the claims to further prosecution based on comments made by the Examiner in the current Office Action. Applicants believe that the claims submitted herewith are in condition for allowance.

Based on the above amendments and the following remarks, Applicants respectfully request that the Examiner reconsider all objections and rejections and that they be withdrawn.

I. Statement of the Substance of the Interview

Applicants thank Examiner Maria Gomez Leavitt for her time in participating in a telephonic Interview on October 21, 2010 to discuss the Office Action of July 22, 2010 with Applicants' representatives Scott A. Schaller and Kathleen B. Kalafus. During the Interview, the claims and rejections were discussed in view of Applicants' amendment and reply of August 25, 2009.

II. Election of Species Requirement

Applicants also thank the Examiner for reconsideration and withdrawal of the election of species requirement among the fucoxanthin chlorophyll binding protein

promoters *fcpA*, *fcpB*, *fcpC* and *fcpE* and between the hexose transport proteins Glut1 and Hup1.

III. Rejections under 35 U.S.C. § 102

In order to anticipate a claim, **a single reference must teach and enable each and every element of that claim.** See M.P.E.P. § 2131 at pg. 2100-67, 8th Ed., Rev. 6, Sept. 2007, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Claims 1, 3, 5, 6, 8, 10, 24, 25, 32, 33, 35, 37, 39, 40, 41, 48, 49, 51, 53, and 55 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Hallmann *et al.*, *Proc. Natl. Acad. Sci.* 93: 669-673 (1996) ("Hallmann *et al.*"). Applicants respectfully traverse the rejection.

Solely to further prosecution and not in agreement with any rejections in the Office Action, claims 1 and 6 have been amended herewith to recite that the cells are Baccilariophyta cells, claim 1 has been amended to recite that the cells are "capable of undergoing cell division in the dark after 24 hours of culture in the dark," and claim 6 has been amended to recite that the catabolizable carbon source is transported into the cell in an amount sufficient "to support heterotrophic cell division."

Hallmann *et al.* discusses transformation of *Volvox* cells with a Hup1 hexose transporter to transport radioactive sugars into the cells for metabolic labeling experiments. See Abstract. *Volvox* cells are categorized under the Phylum Chlorophyta, not under the Phylum Baccilariophyta as recited in claims 1 and 6. As such, Hallmann *et al.* does not teach a Baccilariophyta cell comprising chimeric DNA encoding a protein

which will transport a catabolizable carbon source into the cell, wherein the cell is capable of undergoing cell division in the dark after 24 hours of culture in the dark, or wherein the cell is capable of heterotrophic cell division. Thus, Hallman *et al.* does not teach and enable each and every element of the claims and cannot anticipate the claims under 35 U.S.C. § 102(b).

Based on the foregoing, Applicants respectfully request that the Examiner reconsider and withdraw the anticipation rejection.

IV. Rejections under 35 U.S.C. § 103

As noted by the Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 ("Examination Guidelines"): "In short, the focus when making a determination of obviousness should be on what a person of ordinary skill in the pertinent art would have known at the time of the invention, and on what such a person would have **reasonably** expected to have been able to do in view of that knowledge." See M.P.E.P., 8th Ed. at § 2141, pg. 2100-117, 1st col., 1st full paragraph, and 72 Fed. Reg. 57526 (Oct. 10, 2007) at 57527, 3rd col., 1st full paragraph (emphasis added).

A. Rejections of Claims 1, 2, 6 and 7

Claims 1, 2, 6 and 7 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Hallmann *et al.* in view of Dunahay *et al.*, J. Phycol. 31: 1004-1012 (1995) ("Dunahay *et al.*"), in further view of Fisher *et al.*, J. Phycol. 35: 113-120 (1999) ("Fisher *et al.*"). Applicants respectfully traverse the rejection. Claims 2 and 7 have been cancelled; thus, Applicants address the rejection with regards to amended claims 1 and 6.

With regards to claim 1, Applicants teach that wild-type Baccilariophyta cells are unable to undergo cell division in the dark after 24 hours (*see*, pg. 37, lines 12-15 and Figure 7), while cells transformed with a protein that will transport a catabolizable carbon source are able to undergo cell division in the dark after 24 hours (*see* Figure 7). With regards to claim 6, Applicants teach that wild-type Baccilariophyta cells grow photosynthetically and that added catabolizable carbon source has no effect on cell division, while transformed cells demonstrate heterotrophic cell division in both the light and the dark in the presence of catabolizable carbon source. *See*, for example, pg. 37, line 15, to pg. 38, line 4; and pg. 48, Example 8.

In contrast, Hallmann *et al.* discusses the transformation of *Volvox* cells with a Hup1 hexose transporter to transport radioactive sugars into the cells for metabolic labeling experiments. *See* Abstract. Hallmann *et al.* does not teach a Baccilariophyta cell comprising chimeric DNA encoding a protein which will transport a catabolizable carbon source into the cell, wherein the cell is capable of undergoing cell division in the dark after 24 hours of culture in the dark or wherein the transformed Baccilariophyta cell is capable of heterotrophic cell division. In fact, Hallmann *et al.* states that *Volvox* cells transformed with the Hup1 hexose transporter **fail to grow** (i.e., do not divide) on glucose when cultured in the dark. *See* Hallmann *et al.*, Abstract; pg. 669, "Culture Conditions," and pg. 671, first and second cols., bridging para. As such, Hallmann *et al.* provides no teaching or suggestion that would have reasonably led one of ordinary skill in the art at the application filing date to produce the subject matter recited in claims 1 and 6.

Dunahay *et al.* and Fisher *et al.* fail to overcome the deficiencies of Hallmann *et al.* Dunahay *et al.* discusses transformation of two species of diatoms, *Cyclotella cryptica* and *Navicula saprophila* with the *E. coli nptII* gene. Dunahay *et al.* does not teach transformation of a Bacillariophyta cell with a transporter of a catabolizable carbon source. Fischer *et al.* discusses a *C. fusiformis* cell transformed with the *Chlorella* Hup1 transporter but states that that "transformants were **not able to grow on glucose in the dark.**" See Fischer *et al.* at pg. 118, last sentence of first para., emphasis added. Thus, like Hallman *et al.*, Fischer *et al.* fails to provide any teaching or suggestion that would have reasonably led one of ordinary skill in the art at the application filing date to produce the subject matter recited in claims 1 and 6. Accordingly, Hallman *et al.*, Dunahay *et al.*, and Fisher *et al.*, alone or in any combination, cannot render claims 1 and 6 obvious.

Based on the foregoing, the Examiner is respectfully requested to reconsider and withdraw the obviousness rejection of claims 1 and 6.

B. Rejections of Claims 4 and 9

Claims 4 and 9 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Hallmann *et al.* in view of Dunahay *et al.*, in further view of Fisher *et al.*, and in further view of Lemoine *et al.*, FEBS Letters 454: 325-330 (1999) ("Lemoine *et al.*"). Applicants respectfully traverse the rejection.

Claims 4 and 9 are dependent from claims 1 and 6, respectively, and recite that the protein which will transport a catabolizable carbon source is a "disaccharide transporter." Claims 4 and 9 are non-obvious over Hallmann *et al.* in view of Dunahay

et al., in further view of Fisher *et al.* for the same reasons as discussed above regarding non-obviousness of claims 1 and 6.

Lemoine *et al.* does not overcome the deficiencies of Hallmann *et al.* in view of Dunahay *et al.*, in further view of Fisher *et al.* Lemoine *et al.* discusses isolation of a sucrose transporter-like protein from a tobacco pollen cDNA library. *See* Abstract. Lemoine *et al.* fails to teach a Baccilariophyta cell comprising chimeric DNA encoding a protein which will transport a catabolizable carbon source into the cell, wherein the cell is capable of undergoing cell division in the dark after 24 hours of culture in the dark, or wherein the transformed Baccilariophyta cell is capable of heterotrophic cell division. There is no teaching or suggestion in Lemoine *et al.*, alone or in combination with any of the cited documents, that would have reasonably lead one of ordinary skill in the art at the application filing date to produce the subject matter of claims 1 and 6. Accordingly, Hallman *et al.*, Dunahay *et al.*, Fisher *et al.*, and Lemoine *et al.*, alone or in any combination, cannot render claims 4 and 9 obvious.

Based on the foregoing, the Examiner is respectfully requested to reconsider and withdraw the obviousness rejection of claims 4 and 9.

C. Rejection of Claims 1, 6, 23-31 and 40-47

Claims 1, 6, 23-31 and 40-47 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Hallmann *et al.* in view of U.S. Patent No. 4,235,043 ("Harasawa *et al.*"), in further view of Apt *et al.*, *Mol. Gen. Genet.* 252: 572-579 (1996) ("Apt *et al.*"), in further view of Fisher *et al.* Applicants respectfully traverse the rejection. Claims 23-26

and 40-42 have been cancelled; thus, Applicants address the rejection with regards to amended claims 1, 6, 27-31, and 43-47.

Claims 27-31 and 43-47 depend from claim 1 or claim 6. The deficiencies of Hallman *et al.* and Fisher *et al.* with respect to claims 1 and 6 are discussed above. Harasawa *et al.* and Apt *et al.* fail to overcome the deficiencies of Hallman *et al.* and Fisher *et al.* with regards to claims 1 and 6, or the dependent claims therefrom.

Harasawa *et al.* discusses a method for cultivating algae in light having particular wavelengths. Apt *et al.* discusses the transformation of *Phaeodactylum tricornutum* cells with the *sh ble* gene from *Streptoalloteichus hindustanus*. Neither Apt *et al.* nor Harasawa *et al.* teach or suggest a Baccilariophyta cell comprising chimeric DNA encoding a protein which will transport a catabolizable carbon source into the cell, wherein the cell is capable of undergoing cell division in the dark after 24 hours of culture in the dark, or wherein the transformed Baccilariophyta cell is capable of heterotrophic cell division. Furthermore, there is no teaching or suggestion in either Harasawa *et al.* or Apt *et al.*, alone or in combination with any of the cited documents, that would have reasonably lead one of ordinary skill in the art at the application filing date to produce the subject matter of claims 1 and 6, or any dependent claim therefrom. Accordingly, Hallman *et al.*, Harasawa *et al.*, Fisher *et al.*, and Apt *et al.*, alone or in any combination, cannot render claims 1 and 6 obvious, or any dependent claim therefrom.

Based on the foregoing, the Examiner is respectfully requested to reconsider and withdraw the obviousness rejection of claims 1, 6, 23-31, and 43-47.

D. Rejection of Claims 4, 9, 34, 36, 50, and 52

Claims 4, 9, 34, 36, 50, and 52 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Hallmann *et al.* in view of Harasawa *et al.*, in further view of Apt *et al.*, in further view of Fisher *et al.*, in further view of Lemoine *et al.* Applicants respectfully traverse the rejection.

Claims 4, 9, 34, 36, 50, and 52 depend from claim 1 or claim 6. The deficiencies of Hallman *et al.*, Fisher *et al.*, Harasawa *et al.*, Apt *et al.*, and Lemoine *et al.* with respect to claims 1 and 6 are discussed above and are applicable to dependent claims 4, 9, 34, 36, 50, and 52. As discussed above, the cited documents in any combination would not have lead one of ordinary skill in the art at the application filing to produce the subject matter of claims 1 and 6, or any dependent claim therefrom. Accordingly, Hallman *et al.*, Fisher *et al.*, Harasawa *et al.*, Apt *et al.*, and Lemoine *et al.*, alone or in any combination, cannot render claims 4, 9, 34, 36, 50, and 52 obvious.

Based on the foregoing, the Examiner is respectfully requested to reconsider and withdraw the obviousness rejection of claims 4, 9, 34, 36, 50, and 52.

E. Rejection of Claims 38 and 54

Claims 38 and 54 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Hallmann *et al.* in view of Harasawa *et al.*, in further view of Apt *et al.*, in further view of Fisher *et al.*, in further view of Asano *et al.*, *J. Biol. Chem.* 36: 24632-24636 (1991) ("Asano *et al.*"). Applicants respectfully traverse the rejection.

Claims 38 and 54 depend from claims 1 and 6, respectively, and recite Glut1 as the protein that will transport a catabolizable carbon source into the cell. The

deficiencies of Hallmann *et al.*, Harasawa *et al.*, Apt *et al.*, and Fisher *et al.* with respect to claims 1 and 6 are discussed above and are applicable to claims 38 and 54. Asano *et al.* does not overcome the deficiencies of Hallmann *et al.*, Harasawa *et al.*, Apt *et al.*, and Fisher *et al.* Asano *et al.* discusses Glut1 as a mammalian glucose transporter and discusses mutations in Glut1 that remove possible sites for *N*-linked glycosylation. See the Introduction and Abstract. Asano *et al.* does not teach a Baccilariophyta cell comprising chimeric DNA encoding a protein which will transport a catabolizable carbon source into the cell, wherein the cell is capable of undergoing cell division in the dark after 24 hours of culture in the dark, or wherein the transformed Baccilariophyta cell is capable of heterotrophic cell division. Furthermore, there is no teaching or suggestion in Asano *et al.*, alone or in combination with any of the cited documents, that would have reasonably lead one of ordinary skill in the art at the application filing date to produce the subject matter of claims 38 and 54. Accordingly, Hallman *et al.*, Harasawa *et al.*, Fisher *et al.*, Apt *et al.*, and Asano *et al.*, alone or in any combination, cannot render claims 38 and 54 obvious.

Based on the foregoing, the Examiner is respectfully requested to reconsider and withdraw the obviousness rejection of claims 38 and 54.

V. Provisional Non-Statutory Double Patenting Rejection

Claims 1-10 and 23-55 were provisionally rejected under the judicially created doctrine of non-statutory obviousness-type double patenting over claims 1-10 and 23-63 of copending U.S. Appl. No. 11/842,898. Applicants note that the present application is the earlier-filed application and believe that the amendments presented herein will place the present application in condition for allowance. Thus, Applicants request the Examiner to hold the provisional rejection in abeyance until the arguments herewith have

been considered, and to withdraw the rejection upon allowance of the present claims in accordance with MPEP § 1490(V)(D).

VI. Notice to Comply with Sequence Rules

The Examiner objected to the specification at page 40, lines 10-23 as failing to comply with the requirements of 37 C.F.R. 1.821 through 1.825 for failure to list SEQ ID NO identifiers. Applicants have herein amended page 40, lines 10-23 to recite the SEQ ID NO for each sequence listed and have reviewed the remaining disclosure for compliance with 37 C.F.R. 1.821(d). Based on the amendment, Applicants believe that the specification is in compliance with 37 C.F.R. 1.821(d) and request reconsideration and withdrawal of the objection.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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